

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-51. (Cancelled)

52. (New) In a device that includes an assigned identifier and ATA connection pins for connecting to corresponding signal lines in a single ATA bus, wherein the ATA connection pins include data lines, PDIAG and INTRQ connection pins, a method of operating the device, comprising:

- 5 receiving a selection command that includes a selection identifier from the data lines;
- comparing the selection identifier with the assigned identifier; and
- asserting PDIAG and INTRQ in response to the selection identifier matching the assigned identifier.

53. (New) The method of claim 52, including waiting until PDIAG is negated and then asserting PDIAG and INTRQ in response to the selection identifier matching the assigned identifier.

54. (New) The method of claim 52, including asserting PDIAG and INTRQ in response to the selection identifier matching the assigned identifier and to determining that an ATA controller external to the device does not include additional hardware.

55. (New) The method of claim 52, including clearing a BSY bit and setting a DRDY bit in a status register in response to the selection identifier matching the assigned identifier.

56. (New) The method of claim 52, including enabling drivers for the data lines in response to the selection identifier matching the assigned identifier.

57. (New) The method of claim 52, including asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the assigned identifier.

58. (New) The method of claim 52, including asserting PDIAG and enabling drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the assigned identifier.

59. (New) The method of claim 52, including tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the assigned identifier.

60. (New) The method of claim 52, including:

receiving a second selection command that includes a second selection identifier from the data lines after asserting PDIAG and INTRQ in response to the selection identifier matching the assigned identifier;

5 comparing the second selection identifier with the assigned identifier; and

tristating the data lines, PDIAG and INTRQ in response to the second selection identifier not matching the assigned identifier.

61. (New) The method of claim 52, wherein the device is a hard disk drive.

62. (New) In a device that includes ATA connection pins for connecting to corresponding signal lines in a single ATA bus, wherein the ATA connection pins include data lines, PDIAG and INTRQ connection pins, a method of operating the device, comprising:

5 assigning an assigned identifier;

 receiving a selection command that includes a selection identifier from the data lines;

 comparing the selection identifier with the assigned identifier;

 waiting until PDIAG is negated and then asserting PDIAG and INTRQ in

10 response to the selection identifier matching the assigned identifier; and

 tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the assigned identifier.

63. (New) The method of claim 62, including asserting PDIAG and INTRQ in response to the selection identifier matching the assigned identifier and to determining that an ATA controller external to the device does not include additional hardware.

64. (New) The method of claim 62, including tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the assigned identifier and to determining that an ATA controller external to the device does not include additional hardware.

65. (New) The method of claim 62, including clearing a BSY bit and setting a DRDY bit in a status register in response to the selection identifier matching the assigned identifier.

66. (New) The method of claim 62, including enabling drivers for the data lines in response to the selection identifier matching the assigned identifier.

67. (New) The method of claim 62, including asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the assigned identifier.

68. (New) The method of claim 62, including asserting PDIAG and enabling drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the assigned identifier.

69. (New) The method of claim 62, including assigning the assigned identifier using software switches.

70. (New) The method of claim 62, including assigning the assigned identifier using jumpers.

71. (New) The method of claim 62, wherein the device is a hard disk drive.

72. (New) In a device that includes ATA connection pins for connecting to corresponding signal lines in a single ATA bus, wherein the ATA connection pins include data lines, DASP, PDIAG and INTRQ connection pins, a method of operating the device, comprising:

5 assigning an assigned identifier;

 receiving a selection command that includes a selection identifier from the data lines;

 comparing the selection identifier with the assigned identifier;

 waiting until PDIAG is negated and then asserting PDIAG and INTRQ in

10 response to the selection identifier matching the assigned identifier and to determining that an ATA controller external to the device does not include additional hardware; and

 tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the assigned identifier and to determining that the controller does not include the additional hardware.

73. (New) The method of claim 72, including asserting DASP in response to the selection identifier matching the assigned identifier and to determining that the controller includes the additional hardware.

74. (New) The method of claim 72, including tristating the data lines and negating DASP in response to the selection identifier not matching the assigned identifier and to determining that the controller includes the additional hardware.

75. (New) The method of claim 72, including clearing a BSY bit and setting a DRDY bit in a status register in response to the selection identifier matching the assigned identifier and to determining that the controller does not include the additional hardware.

76. (New) The method of claim 72, including enabling drivers for the data lines in response to the selection identifier matching the assigned identifier and to determining that the controller does not include the additional hardware.

77. (New) The method of claim 72, including asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the assigned identifier and to determining that the controller does not include the additional hardware.

78. (New) The method of claim 72, including asserting PDIAG and enabling drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the assigned identifier and to determining that the controller does not include the additional hardware.

79. (New) The method of claim 72, including assigning the assigned identifier using software switches.

80. (New) The method of claim 72, including assigning the assigned identifier using jumpers.

81. (New) The method of claim 72, wherein the device is a hard disk drive.

82. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the ATA bus is connected to the controller and the devices and includes data, PDIAG and INTRQ lines, the first device includes a first assigned identifier and the second device includes a second assigned identifier, a method
5 of selecting one of the devices, comprising:

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the first device comparing the selection identifier with the first assigned identifier;

the second device comparing the selection identifier with the second assigned
10 identifier; and

the first device asserting PDIAG and INTRQ in response to the selection identifier matching the first assigned identifier.

83. (New) The method of claim 82, including the first device waiting until PDIAG is negated by the second device and then asserting PDIAG and INTRQ in response to the selection identifier matching the first assigned identifier.

84. (New) The method of claim 82, including the first device asserting PDIAG and INTRQ in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include additional hardware.

85. (New) The method of claim 82, including the first device clearing a BSY bit and setting a DRDY bit in its status register in response to the selection identifier matching the first assigned identifier.

86. (New) The method of claim 82, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier.

87. (New) The method of claim 82, including the first device asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the first assigned identifier.

88. (New) The method of claim 82, including the first device asserting PDIAG and enabling its drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the first assigned identifier.

89. (New) The method of claim 82, including the second device tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the second assigned identifier.

90. (New) The method of claim 82, including:

the controller sending a second selection command that includes a second selection identifier across the data lines to the devices after the first device asserts PDIAG and INTRQ in response to the selection identifier matching the first assigned identifier;

5 the first device comparing the second selection identifier with the first assigned identifier;

the second device comparing the second selection identifier with the second assigned identifier;

10 the first device tristating the data lines, PDIAG and INTRQ in response to the second selection identifier not matching the first assigned identifier; and

the second device asserting PDIAG and INTRQ in response to the second selection identifier matching the second assigned identifier.

91. (New) The method of claim 82, wherein the devices are hard disk drives.

92. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the ATA bus is connected to the controller and the devices and includes data, PDIAG and INTRQ lines, a method of selecting one of the devices, comprising:

5 the first drive receiving a first assigned identifier;

the second drive receiving a second assigned identifier;

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the first device comparing the selection identifier with the first assigned identifier;
10 the second device comparing the selection identifier with the second assigned
identifier;
the first device waiting until PDIAG is negated and then asserting PDIAG and
INTRQ in response to the selection identifier matching the first assigned identifier; and
the second device tristating the data lines, PDIAG and INTRQ in response to the
15 selection identifier not matching the second assigned identifier.

93. (New) The method of claim 92, including the first device asserting PDIAG
and INTRQ in response to the selection identifier matching the first assigned identifier
and to determining that the controller does not include additional hardware.

94. (New) The method of claim 92, including the second device tristating the data
lines, PDIAG and INTRQ in response to the selection identifier not matching the second
assigned identifier and to determining that the controller does not include additional
hardware.

95. (New) The method of claim 92, including the first device clearing a BSY bit
and setting a DRDY bit in its status register in response to the selection identifier
matching the first assigned identifier.

96. (New) The method of claim 92, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier.

97. (New) The method of claim 92, including the first device asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the first assigned identifier.

98. (New) The method of claim 92, including the first device asserting PDIAG and enabling its drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the first assigned identifier.

99. (New) The method of claim 92, including assigning the first assigned identifier to the first device using software switches in the first device.

100. (New) The method of claim 92, including assigning the first assigned identifier to the first device using jumpers on the first device.

101. (New) The method of claim 92, wherein the devices are hard disk drives.

102. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the ATA bus is connected to the controller and the

devices and includes data, DASP, PDIAG and INTRQ lines, a method of selecting one of the devices, comprising:

- 5 assigning a first assigned identifier to the first device;
- assigning a second assigned identifier to the second device;
- the controller sending a selection command that includes a selection identifier across the data lines to the devices;
- the first device comparing the selection identifier with the first assigned identifier;
- 10 the second device comparing the selection identifier with the second assigned identifier;
- the first device waiting until PDIAG is negated by the second device and then asserting PDIAG and INTRQ in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include additional
- 15 hardware; and
- the second device tristating the data lines, PDIAG and INTRQ in response to the selection identifier not matching the second assigned identifier and to determining that the controller does not include the additional hardware.

103. (New) The method of claim 102, including the first device asserting DASP in response to the selection identifier matching the first assigned identifier and to determining that the controller includes the additional hardware.

104. (New) The method of claim 102, including the second device tristating the data lines and negating DASP in response to the selection identifier not matching the

second assigned identifier and to determining that the controller includes the additional hardware.

105. (New) The method of claim 102, including the first device clearing a BSY bit and setting a DRDY bit in its status register in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include the additional hardware.

106. (New) The method of claim 102, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include the additional hardware.

107. (New) The method of claim 102, including the first device asserting PDIAG and then asserting INTRQ in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include the additional hardware.

108. (New) The method of claim 102, including the first device asserting PDIAG and enabling its drivers for the data lines and INTRQ and then asserting INTRQ in response to the selection identifier matching the first assigned identifier and to determining that the controller does not include the additional hardware.

109. (New) The method of claim 102, including assigning the first assigned identifier to the first device using software switches in the first device.

110. (New) The method of claim 102, including assigning the first assigned identifier to the first device using jumpers on the first device.

111. (New) The method of claim 102, wherein the devices are hard disk drives.

112. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the controller includes a selected status register, the ATA bus is connected to the controller and the devices and includes data lines and first and second DASP lines, the DASP lines are connected to the selected status register, the first device is connected to the first DASP line and includes a first assigned identifier and the second device is connected to the second DASP line includes a second assigned identifier, a method of selecting one of the devices, comprising:

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the first device comparing the selection identifier with the first assigned identifier;
the second device comparing the selection identifier with the second assigned identifier;

the first device asserting DASP in response to the selection identifier matching the first assigned identifier, thereby setting a first bit in the selected status register; and

15 the controller reading the selected status register to verify that the first device is selected and the second device is not selected.

113. (New) The method of claim 112, including the first device asserting DASP in response to the selection identifier matching the first assigned identifier and to determining that the controller includes additional hardware.

114. (New) The method of claim 112, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier.

115. (New) The method of claim 112, including the second device negating DASP in response to the selection identifier not matching the second assigned identifier.

116. (New) The method of claim 112, including the second device tristating the data lines in response to the selection identifier not matching the second assigned identifier.

117. (New) The method of claim 112, including the controller reading the selected status register to verify that the devices are ready to receive a command, and then the controller sending the selection command.

118. (New) The method of claim 112, including:

the controller sending a second selection command that includes a second selection identifier across the data lines to the devices after the first device asserts DASP in response to the selection identifier matching the first assigned identifier;

5 the first device comparing the second selection identifier with the first assigned identifier;

the second device comparing the second selection identifier with the second assigned identifier;

10 the first device negating DASP in response to the second selection identifier not matching the first assigned identifier, thereby clearing the first bit in the selected status register;

the second device asserting DASP in response to the second selection identifier matching the second assigned identifier, thereby setting a second bit in the selected status register; and

15 the controller reading the selected status register to verify that the second device is selected and the first device is not selected.

119. (New) The method of claim 112, wherein the first device is disconnected from the second DASP line and the second device is disconnected from the first DASP line.

120. (New) The method of claim 112, wherein the first device is connected to the second DASP line and the second device is connected to the first DASP line.

121. (New) The method of claim 112, wherein the devices are hard disk drives.

122. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the controller includes a selected status register, the ATA bus is connected to the controller and the devices and includes data lines and first and second DASP lines, the DASP lines are connected to the selected status register, the first device is connected to the data lines and the first DASP line and includes a first assigned identifier and the second device is connected to the data lines and the second DASP line includes a second assigned identifier, a method of selecting one of the devices, comprising:

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the first device comparing the selection identifier with the first assigned identifier; the second device comparing the selection identifier with the second assigned identifier;

the first device asserting DASP in response to the selection identifier matching the first assigned identifier, thereby setting a first bit in the selected status register;

the second device negating DASP in response to the selection identifier not matching the second assigned identifier, thereby not setting a second bit in the selected status register; and

the controller sending a read/write command across the ATA bus to the first device in response to reading the selected status register to verify that the first device is selected and the second device is not selected.

123. (New) The method of claim 122, including the first device asserting DASP in response to the selection identifier matching the first assigned identifier and to determining that the controller includes additional hardware.

124. (New) The method of claim 122, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier.

125. (New) The method of claim 122, including the second device negating DASP in response to the selection identifier not matching the second assigned identifier and to determining that the controller includes additional hardware.

126. (New) The method of claim 122, including the second device tristating the data lines in response to the selection identifier not matching the second assigned identifier.

127. (New) The method of claim 122, including the controller reading the selected status register to verify that the devices are ready to receive a command, and then the controller sending the selection command.

128. (New) The method of claim 122, including:

the controller sending a second selection command that includes a second selection identifier across the data lines to the devices after the controller sends the read/write command;

5 the first device comparing the second selection identifier with the first assigned identifier;

the second device comparing the second selection identifier with the second assigned identifier;

10 the first device negating DASP in response to the second selection identifier not matching the first assigned identifier, thereby clearing the first bit in the selected status register;

the second device asserting DASP in response to the second selection identifier matching the second assigned identifier, thereby setting the second bit in the selected status register; and

15 the controller sending a second read/write command across the ATA bus to the second device in response to reading the selected status register to verify that the second device is selected and the first device is not selected.

129. (New) The method of claim 122, wherein the first device is disconnected from the second DASP line and the second device is disconnected from the first DASP line.

130. (New) The method of claim 122, wherein the first device is connected to the second DASP line and the second device is connected to the first DASP line.

131. (New) The method of claim 122, wherein the devices are hard disk drives.

132. (New) In an ATA bus system that includes a controller, a single ATA bus and first and second devices, wherein the controller includes a selected status register and an interrupt pending register, the ATA bus is connected to the controller and the devices and includes data lines, first and second DASP lines and first and second INTRQ lines,
5 the DASP lines are connected to the selected status register, the INTRQ lines are connected to the interrupt pending register, the first device is connected to the data lines and the first DASP and INTRQ lines and includes a first assigned identifier and the second device is connected to the data lines and the second DASP and INTRQ lines includes a second assigned identifier, a method of selecting one of the devices,
10 comprising:

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the first device comparing the selection identifier with the first assigned identifier;

the second device comparing the selection identifier with the second assigned
15 identifier;

the first device asserting DASP in response to the selection identifier matching the first assigned identifier, thereby setting a first bit in the selected status register;

20

the second device negating DASP in response to the selection identifier not matching the second assigned identifier, thereby not setting a second bit in the selected status register; and

the controller sending a read/write command across the ATA bus to the first device in response to reading the selected status register to verify that the first device is selected and the second device is not selected.

133. (New) The method of claim 132, including the first device asserting DASP in response to the selection identifier matching the first assigned identifier and to determining that the controller includes additional hardware.

134. (New) The method of claim 132, including the first device enabling its drivers for the data lines in response to the selection identifier matching the first assigned identifier.

135. (New) The method of claim 132, including the second device negating DASP in response to the selection identifier not matching the second assigned identifier and to determining that the controller includes additional hardware.

136. (New) The method of claim 132, including the second device tristating the data lines in response to the selection identifier not matching the second assigned identifier.

137. (New) The method of claim 132, including the controller reading the selected status register to verify that the devices are ready to receive a command, and then the controller sending the selection command.

138. (New) The method of claim 132, including:

the controller sending a second selection command that includes a second selection identifier across the data lines to the devices after the controller sends the read/write command;

5 the first device comparing the second selection identifier with the first assigned identifier;

the second device comparing the second selection identifier with the second assigned identifier;

10 the first device negating DASP in response to the second selection identifier not matching the first assigned identifier, thereby clearing the first bit in the selected status register;

the second device asserting DASP in response to the second selection identifier matching the second assigned identifier, thereby setting the second bit in the selected status register; and

15 the controller sending a second read/write command across the ATA bus to the second device in response to reading the selected status register to verify that the second device is selected and the first device is not selected.

139. (New) The method of claim 132, wherein the first device is disconnected from the second DASP and INTRQ lines and the second device is disconnected from the first DASP and INTRQ lines.

140. (New) The method of claim 132, wherein the first device is connected to the second DASP and INTRQ lines and the second device is connected to the first DASP and INTRQ lines.

141. (New) The method of claim 132, wherein the devices are hard disk drives.

142. (New) In an ATA bus system that includes a controller, a single ATA bus and N devices, wherein the controller includes a selected status register, the ATA bus is connected to the controller and the devices and includes data lines and N DASP lines, the DASP lines are connected to the selected status register, the devices are each connected to the data lines and one of the DASP lines and disconnected from the other DASP lines such that each of the DASP lines is dedicated to one of the devices, the devices each include a unique assigned identifier, and N is an integer in the range of 3 to 8, a method of selecting one of the devices, comprising:

the controller sending a selection command that includes a selection identifier across the data lines to the devices;

the devices each comparing the selection identifier with its assigned identifier;

the device that matches the selection identifier to its assigned identifier becoming a selected device that asserts DASP in response to the selection identifier matching its assigned identifier, thereby setting a corresponding bit in the selected status register;

15 the other devices that each do not match the selection identifier to its assigned identifier becoming a non-selected device that negates DASP in response to the selection identifier not matching its assigned identifier, thereby not setting a corresponding bit in the selected status register; and

20 the controller sending a read/write command across the ATA bus to the selected device in response to reading the selected status register to verify that the selected device is selected and the non-selected devices are not selected.

143. (New) The method of claim 142, including the selected device asserting DASP in response to the selection identifier matching its assigned identifier and to determining that the controller includes additional hardware.

144. (New) The method of claim 142, including the selected device enabling its drivers for the data lines in response to the selection identifier matching its assigned identifier.

145. (New) The method of claim 142, including the non-selected devices each negating DASP in response to the selection identifier not matching its assigned identifier and to determining that the controller includes additional hardware.

146. (New) The method of claim 142, including the non-selected devices each tristating the data lines in response to the selection identifier not matching its assigned identifier.

147. (New) The method of claim 142, including the controller reading the selected status register to verify that the devices are ready to receive a command, and then the controller sending the selection command.

148. (New) The method of claim 142, including:

the controller sending a second selection command that includes a second selection identifier across the data lines to the devices after the controller sends the read/write command;

5 the devices each comparing the second selection identifier with its assigned identifier;

the device that matches the second selection identifier to its assigned identifier becoming the selected device that asserts DASP in response to the second selection identifier matching its assigned identifier, thereby setting a corresponding bit in the selected status register;

10 the other devices, including the device selected by the selection command, that each do not match the second selection identifier to its assigned identifier becoming a non-selected device that negates DASP in response to the second selection identifier not matching its assigned identifier, thereby not setting a corresponding bit in the selected status register; and

15

the controller sending a second read/write command across the ATA bus to the selected device in response to reading the selected status register to verify that the selected device is selected and the non-selected devices are not selected.

149. (New) The method of claim 142, wherein the controller includes a ready status register, the ATA bus includes N PDIAG lines, the PDIAG lines are connected to the ready status register, the devices are each connected to one of the PDIAG lines and disconnected from the other PDIAG lines such that each of the PDIAG lines is dedicated
5 to one of the devices, and the method includes a power-up sequence, comprising:

the devices each asserting DASP within a predetermined time of the power turning on;

the devices each asserting PDIAG and negating DASP when it is ready to receive a command; and

10 the controller sending a command across the ATA bus to the devices in response to reading the selected status register and the ready status register to verify that the devices are ready to receive a command.

150. (New) The method of claim 142, wherein the controller includes an interrupt pending register, an interrupt mask register and decoding logic, the ATA bus includes N INTRQ lines, the INTRQ lines are connected to the interrupt pending register, the devices are each connected to one of the INTRQ lines and disconnected from the other
5 INTRQ lines such that each of the INTRQ lines is dedicated to one of the devices, and the method includes interrupt handling, comprising:

the controller setting a bit in the interrupt mask register corresponding to the selected device;

10 the controller not setting bits in the interrupt mask register corresponding to the non-selected devices;

the selected device asserting INTRQ, thereby setting a corresponding bit in the interrupt pending register;

a non-selected device asserting INTRQ, thereby setting a corresponding bit in the interrupt pending register;

15 the decoding logic generating an interrupt request for a host computer in response to the interrupt pending register and the interrupt mask register indicating that the selected device is asserting INTRQ; and

the decoding logic not generating the interrupt request for the host computer in response to the interrupt pending register and the interrupt mask register indicating that
20 the non-selected device is asserting INTRQ.

151. (New) The method of claim 142, wherein the devices are hard disk drives.